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24. Irrigation and mechanization for seed production of sulfur buckwheat, a native forb. (ABSTRACT). Shock, C., Feibert, E. B. G., and Saunders, L. D. HortScience 44(4):1183. 2009.

conventional and organic production of basil in Alabama. Six-week old seedlings were transplanted from the greenhouse into field plots arranged in a randomized complete-block design with four replications. Three *Ocimum* accessions, Ames 23154, Ames 23155, and PI 288779 were main plot treatments. The accessions were compared for growth, leaf area development, photosynthetically active radiation (PAR) interception, canopy cover, and fresh matter accumulation and partitioning pattern over conventional and organic production. Ames 23154 produced higher above ground biomass in conventional (1214.81 g/m^2) than accessions PI 288779 (1176.44 g/m^2) and Ames 23155 (617.44 g/m^2). Ames 23154 produced greater biomass in conventional (1214.81 g/m^2) and in organic (940.55 g/m^2) compared to Ames 23155 and PI 288779. Among agronomic practices, conventional appeared to be optimum as all accessions produced a significantly greater mean canopy, intercepted higher percentage PAR and produced significantly more total biomass and leaf fresh weight than organic basil production. Basil leaves are consumed fresh for alleviating minor ailments and in culinary preparations such as soups, salads, and pesto. PI 288779 partition greater fresh leaf biomass conventional (472.63 g/m^2) and organic (403.8 g/m^2), which are primary source of bioactive compounds in basil than any other accession in conventional and organic production. Genotypic variation for fresh biomass partitioning and relationship among horticultural traits as influenced by conventional and organic production will be discussed in this presentation.

(159) Development of a Miniaturized 24-Well Strawberry Leaf Disk Bioassay for Evaluating Natural Fungicides

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There is great incentive to discover biologically active natural products from higher plants that are more effective than synthetic agrochemicals and are environmentally safe. Research emphasis at the U.S. Department of Agriculture has therefore been on the development of alternative approaches to utilizing natural plant products in pest management. Discovery and evaluation of natural product fungicides is largely dependent upon the availability of miniaturized antifungal bioassays. We report on the development of a miniaturized 24-well leaf disc assay for evaluating plant extracts and pure compounds. Compounds applied directly to the leaf surface can be evaluated in a dose-response for fungicidal activity and phytotoxicity. The assay is sensitive to microgram quantities, can determine chemical sensitivity between fungal isolates, and adaptable to complex mixtures, lipophilic extracts, and non-polar compounds. The use of digital imaging and analytical software provided quantitative data and the ability to fine tune the data analysis. Identification of new potential lead compounds can be repeated quickly in time and real on-the-leaf-surface activity can be evaluated in high throughput formats and published in a reasonable time.

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(160) Insecticidal Activity of Some Plant Extracts

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Natural insecticides have been used in Egypt and some other locations for pest control in crops, offering an effective alternative to synthetic pesticides. To determine the active principles in the plant materials used in Egypt, three species of the Chenopodiaceae family [*Atriplex farinosa* Forssk., *Atriplex nummularia* Lindl., and *Haloxylon salicornicum* (Moq.) Bunge ex Boiss.] and one species in the Resedaceae family (*Ochradenus baccatus* Delile) were investigated. Plant material from each of the target species was ground and the constituents separated by column chromatography. Insecticidal activity of the isolated compounds was tested in feeding, contact, and egg hatchability tests using *Helicoverpa zea* (Boddie), a major agricultural pest that as a larvae feeds on numerous crops, including cotton (cotton bollworm), corn (corn earworm), and tomato (tomato fruitworm). Highest mortality of the larvae occurred when the larvae were in contact with extracts from *A. farinosa*. Extracts from *A. nummularia and H. salicornicum* also exhibited activity against the larvae. Similar trends were determined on the hatchability of eggs, but no significant effects were detected in feeding tests.

Specified Source(s) of Funding: credit card

(161) Yield and Quality of Domestically Grown Chinese Medicinal Plants

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Interest and demand for Chinese medicinal plants in the U.S. is expanding due to increases in the number of practicing acupuncturists and their use of herbal formulas as part of treatment procedures. Recent reports of contaminated goods imported from China have raised concerns about the quality of imported medicinal plant material, leading to demand for plants produced under controlled and documented conditions in accordance with good agricultural practices. To evaluate the potential of domestic cultivation of selected Chinese medicinal plants in the northeastern region of the United States, cultivation trials were done with *Agastache rugosa* (Fisch. & C.A. Mey.) Kuntze, *Leonurus heterophyllus* Sweet, *L. sibiricus* L., and *Schizonepeta tenuifolia* Briq. The plants were seeded in the field in a randomized complete block design in plots containing 0, 100, or 200 kg·ha^{-1} of nitrogen supplied as soybean meal. The nitrogen treatments resulted in a dose-related increase in yield for all the species. A comparison of natural air drying and forced hot air drying resulted in different drying times, but no apparent differences in quality. Preliminary organoleptic evaluation indicates that domestically produced plant material has a higher quality than imported plant material.

Specified Source(s) of Funding: credit card

(162) Irrigation and Mechanization for Seed Production of Sulfur Buckwheat, a Native Forb

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Sulfur buckwheat (*Eriogonum umbellatum*) is one of many forbs native to the intermountain west of the United States. Sulfur buckwheat has been selected for use in rangeland revegetation. Like many native plants, seed production technology is virtually unknown for wild Eriogonium species. Commercial seed production is necessary to provide the quantity of seed needed for rangeland restoration efforts. The seed production response of sulfur buckwheat to irrigation was tested in 2006, 2007, and 2008 at the Malheur Experiment Station in the Treasure Valley of eastern Oregon and southwestern Idaho. Sulfur buckwheat was established in 2005 by direct drilling of the seed in rows 30 inches apart. Irrigation treatments were applied to plots four rows wide and 30 feet long arranged in a randomized complete-block design with four replicates. Irrigation was applied using drip tape installed at 12 inch depth between two rows of plants spaced 30 inches apart. The drip tapes were installed on alternating inter-row spaces (5 feet apart). Sulfur buckwheat was submitted to three irrigation rates: 0, 1, and 2 inches of water applied starting at the beginning of flowering four times for a total of 0, 4, and 8 inches. Weeds were controlled by mechanical cultivation, hand weeding, and broadcast applications of herbicide. Insect and disease pests were not noted. Seed was harvested using a Wintersteiger Nurserymaster small plot combine with a dry bean concave. Seed was cleaned mechanically. In 2006, seed yield increased with increasing water applied up to the highest amount tested of 8 inches. In 2007 and 2008, seed yield showed a quadratic response to irrigation rate. Seed yields were maximized by 8.1 inches and 7.2 inches of water applied in 2007 and 2008, respectively.

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Horticultural Crops Culture and Management: Plant Nutrition 2

Tuesday, 28 July 2009 12:00–12:45 pm

(135) Changes of Amino Acid Compositions in the Leaf and Fruit of 'Fuji' Apple Trees as Influenced by Applications of Amino-Acid Fertilizer

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The aim of the study was to examine whether 'Fuji' apple tree can take up amino acid from foliar spray. Different proline concentrations in liquid amino acid fertilizer were sprayed on 'Fuji' apple trees grafted on M.26 rootstock. The applied amino acid fertilizer contains hydroxyproline, serin, cystine, leucins, lysine and nitrogen. Leaf, fruit skin, and fruit flesh were collected and stored at –70 °C until the contents of amino acids were analyzed. Apple leaves mainly had phophoserine, hydroxyproline, serin, and lysine. The amounts of amino acid in leaves did not show any statistical differences among treatments. However, the contents of amino acids on fruit peel and flesh were affected by foliar spray of amino acid fertilizer. Compared with control, all of amino acid fertilizer treatments increased the phosphoserin contents in apple peel. The fruit peels treated with 50 or 100 $mg \cdot L^{-1}$ of proline amino acid fertilizer had significantly higher citruline than those on control. And the fruit peels treated with 10 or 25 $mg \cdot L^{-1}$ of proline amino-acid fertilizer showed higher contents of lysine than those on the other treatments. The contents of hydroxyproline and lysine in apple flesh were significantly increased in the all treatments of the fertilizer. But there was no hydroxyproline contents in the fruit flesh of control trees. The application of 10 $mg \cdot L^{-1}$ proline amino-acid fertilizer showed the highest glutamic acid contents in the 'Fuji' apple flesh.

(136) Cottonseed and Canola Meal as Organic Fertilizers for Landscape Plants

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Plants need large amounts of nitrogen (N) and other nutrients for proper growth and development. Essential nutrients can be supplied by various sources including organic fertilizers. This study was conducted to determine the effect of using cottonseed and canola meals as organic fertilizers on the growth and ornamental quality of landscape plants. This information can help identify alternative organic fertilizer sources and dispose of excess meal. The effects of incorporating or topdressing with cottonseed meal with or without soapstock, canola meal without soapstock, urea, or no amendment (control) were investigated using plants of marigold (*Tagetes erecta* 'Inca II Gold') and Redbud (*Cercis canadensis)* in a Norge loam (fine-silty, mixed, thermic Udic Paleustolls) at Stillwater, OK. Fertilizers were applied at a rate based on standard N recommendations for landscape plants (4.9 $g \cdot m^{-2}$ N) in May 2008. In each plot, two redbud seedlings were planted 1.5 m apart or four marigold plants were planted 30 cm apart. A buffer zone was left between the end of each plot and the plants, and polyethylene edging was installed between plots to reduce movement of nutrients. Each treatment was replicated 10 times for each species. Plants were measured at planting in May and again in July. Soil samples were collected prior to treatment application and in August for elemental analysis. Leaf samples were collected in August for elemental analysis. Few differences occurred among fertilizer sources and between application methods within fertilizer source for either species. Between May and July, redbud trees receiving incorporated urea grew more in height and caliper than those topdressed with urea. Redbuds receiving urea as a topdress treatment increased in caliper more than those receiving incorporated urea. Redbuds receiving cottonseed meal with soapstock incorporated had greater increases in caliper than with cottonseed meal as a topdress. No differences in redbud leaf elemental content occurred. For marigolds, height increased more in control plots than in plots receiving incorporated cottonseed meal with soapstock. Differences in leaf calcium, sulfur, nickel, and total N content occurred in marigolds. No difference in soil nutrient content occurred among fertilizer treatments for either redbuds or marigolds. Cottonseed and canola meal would be expected to release nutrients slowly, thus treatment differences may be more apparent during the 2009 growing season. Results indicate that canola and cottonseed meals provide sufficient N for the growth of landscape plants.

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(137) Effects of Ammonium to Nitrate Ratios on Substrate pH Shifts During Growth of Calibrachoa with Alkaline Water

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